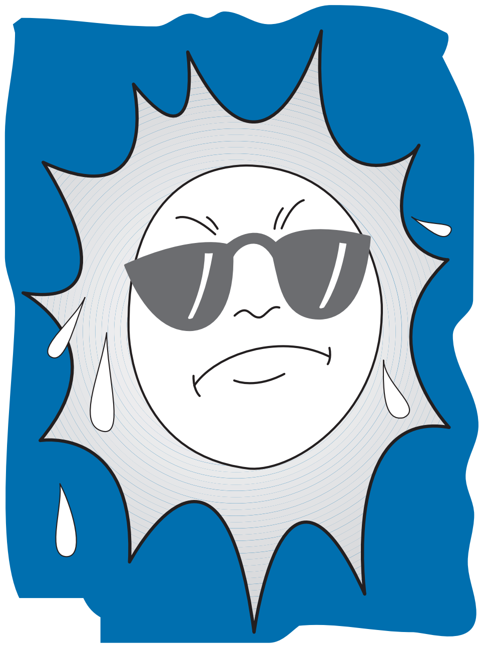
THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

The humidity is too high!”

By Bruce Boe



It was late August, and over much of North Dakota the high humidity still lingered, not just comfortably moist, but oppressive. Sticky. To make matters worse, persistent high pressure had many days allowed temperatures to creep into the 90s, and even above 100. “This is like Minnesota and Wisconsin,” a neighbor familiar with those states remarked. Another complained that the she was “rusting, not tanning.” Mosquitos seemed worse, and each hatch survived longer, or maybe there were just more hatches. Pastures, ditches, and lawns remained fairly green, except in the far west. It just didn’t seem normal.

Has our climate changed? Is North Dakota now more like Minnesota than Montana? The answer, if one looks at the long-term climatic numbers, is apparently, “no.” We’ve not turned into another Minnesota. However, our persistent wet cycle has contributed greatly to the higher humidities that most of us have been struggling with.

The term *humidity* is used to describe the amount of water vapor contained in the air. Water vapor, molecular water in gaseous form, is invisible; it can’t be seen, tasted, or smelled. However, it can be sensed, indirectly.

In warm and hot temperatures, the primary human cooling mechanism is through perspiration. Our wondrous human bodies are water-cooled machines, it seems. When we sweat, our skin surface becomes wet. The liquid perspiration then becomes water vapor, through the process we call evaporation. Evaporation uses up heat, storing it in the newly-created water vapor, and thus resulting in cooling. Evaporation also adds more water vapor to the air, and thus increases the humidity.

There is a limit to how much humidity the air can hold. Mostly, this limit depends upon the temperature- the warmer it is, the more water vapor the air can hold. The ratio of the amount of water vapor in the air to the total amount the air can hold is called the relative humidity (RH). When the two are equal, the RH is 1.00 (100 percent), and the air can contain no more. If the humidity goes even a tiny bit higher, condensation occurs, and a cloud (or fog) forms.

The RH has a lot to do with how quickly evaporation occurs. When the RH is low, evaporation is fast, but as the RH rises, evaporation slows considerably. It then follows that when the RH is low, our perspiration cools us effectively, and we remain comfortable, but when the RH is high, evaporative cooling slows, and we become sticky and overheated. So, even though we can’t see, smell, or taste the RH, we can still sense it.

When summertime rains are frequent we get plenty of evaporation, and plants also use and transpire plenty of water into the atmosphere (evapotranspiration), so the RH stays high. High RH helps generate more rain showers and thunderstorms, causing the humidity to remain high. Ironically, the “cure” for the high water vapor content can result from only two things— cooler temperatures (translate: fall), or less frequent rainfall. The latter has a significant effect in lowering the RH only if dry conditions persist until plant growth slows and/or surface water and soil moisture dries up. And this usually results in a dry spell, and maybe drought.

Thus, our spate of high summertime humidity will end as soon as the state’s wet spell does. And it will end, sooner or later. We just don’t know exactly when. ■

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